

Amendments to the Claims

1. (Currently Amended) An apparatus for smoothly playing a pre-determined sequence of content segments songs transmitted from a server over the Internet, the apparatus comprising a personal computer having a processor, a first memory that stores at least one program used by said processor to control the playing of the sequence of songs, and a second memory which is available to said at least one program for operations;

wherein said at least one program causes said processor at least to:

a processor; and

a memory that stores at least one control program usable by the processor to control the playing of a predetermined sequence of content segments, and wherein the apparatus is configured to:

as soon as a song starts to play, start to download, consecutively, in response to initiation of play of a content segment, initiate downloading to a pre-buffer cache of a first small portion of each of a number of songs content segments which are, in the pre-determined sequence, subsequent to the playing content segments song playing in an alternating fashion, said downloaded small portions being pre-cached in a pre-cache buffer which is an area in said second memory;

as soon as the user skips in response to skipping to a target content segment song whose first small of the predetermined sequence of content segments whose portion has been pre-cached, start to download to the pre-buffer cache, initiate play of the first small downloaded portion of said target song, the target content segment

at the same time as said target song starts to play, deleting all pre-cached songs preceding said target song in said pre-determined sequence; and to

at the same time start to download while playing the downloaded portion of the target content segment, initiate downloading of the rest of the target content segment said target song so that as soon as the playing of the first small portion of said

~~target-song ends, start to play the rest of said target song which is being downloaded from the server over the Internet;~~

~~wherein playtime of said downloaded first small portion is limited to comply with royalty requirements, wherein the pre-determined sequence of content segments is scheduled by a multimedia scheduler configured to schedule content segments for network broadcast, and wherein the multimedia scheduler comprises:~~

~~at least one work manager for each of a plurality of channels serviced, the work manager including at least one producer thread, a task queue and at least one worker thread; and~~

~~one or more scheduler objects associated with each producer thread, wherein the work manager and associated scheduler objects create and maintain a broadcast schedule for each of the channels according to predefined criteria, wherein said at least one producer thread checks a channel at configurable intervals and increments the channel's schedule by generating a work request and placing it in the task queue, wherein the worker threads execute the work requests, and wherein the multimedia scheduler is scalable to service the plurality of broadcast channels and/or services simultaneously.~~

2. (Currently Amended) The apparatus of Claim 1, wherein said ~~first small~~ the portion of the target content segment is approximately the data required for playing of the first ten seconds of the target content segment.

3. (Currently Amended) The apparatus of Claim 1, wherein said ~~number the~~ number of portions of content segment to cache in advance is five.

4. (Currently Amended) The apparatus of Claim 1, wherein said ~~number of songs is all songs the~~ number of portions of content segments to cache in advance is all content segments in the pre-determined sequence of content segments that are subsequent to the song in playing playing content segment.

5. (Currently Amended) The apparatus of Claim 1, wherein said buffer ~~the~~ pre-buffer cache follows a first-in first-out algorithm and allows writing while reading.

6. (Currently Amended) A method for ~~smoothly~~ playing a pre-determined sequence of content segments ~~songs~~ ~~transmitted from a remote server to a local~~ computer having a processor over the Internet, comprising the steps of:

(a) ~~as soon as a song starts to play in response to initiation of play of a a content~~ segment on the local computer, ~~downloading to said to the local computer,~~ consecutively, a first small portion of each of a number of ~~songs of content segments~~ which are, in the pre-determined sequence, subsequent to ~~said song in playing in an~~ alternating fashion, the playing content segment

wherein said first small portion of each of said number of songs downloaded is limited to a playtime not incurring a royalty;

wherein said number of songs is maintained at a single positive integer;

(b) ~~pre-caching said downloaded small the downloaded portions in a pre-cache~~ buffer which is an area of said local device's memory pre-buffer cache of the local computer;

(c) ~~as soon as the user skips in response to skipping from a playing content~~ segment song in play to a target song content segment, checking whether a file for said the portion for the target song exists in said buffer, wherein if the check result is yes, continuing on step (d) content segment is in the pre-buffer cache; and

(d) ~~playing the first small if the portion of the target content segment is in the pre-~~ buffer cache, initiating play of the portion of said target song; and the target content segment from the pre-buffer cache, wherein the pre-determined sequence of content segments was pre-scheduled for network broadcast on one of a plurality of channels, including:

creating and maintaining, by a work manager and associated scheduler objects, a broadcast schedule for each of the channels according to predefined criteria;

checking, by at least one producer thread, the broadcast schedule for each of the channels at configurable intervals;

incrementing, by at least one producer thread, the broadcast schedule for each of the channels by generating a work request and placing the work request in a task queue; and

executing, by worker threads, the work requests(e) at the same time step (d) starts, deleting all pre-cached songs preceding said target song in said pre-determined sequence.

7. (Currently Amended) The method of Claim 6, further comprising the steps of:

(f) as soon as step (d) starts, downloading the rest of said target song at least another portion of the target content segment that is not in the pre-puffer cache; and

(g) playing the rest of said other portion of the target content segment song which is being downloaded from the server over the Internet.

8. (Currently Amended) The method of Claim 7, further comprising the step of:

(h) as soon as step (d) starts, continuing on to step (a), if the portion of the target content segment is in the pre-buffer cache, downloading, consecutively, a portion of each of a number of content segments which are, in the pre-determined sequence, subsequent to the target content segment, wherein if portions of the one or more songs more content segments subsequent to said target song the target content segments are already pre-cached in the pre-buffer cache, skipping said one the downloading of the portions of the one or more songs more content segments already having portions in the pre-buffer cache and downloading the portions of the subsequent ones, consecutively to make up said number content segments such that portions of each of the number of content segments are downloaded to the pre-buffer cache.

9. (Currently Amended) The method of Claim 8, further comprising the steps of:

(i) ~~if no skip command is given by the user while said received while the target song is content segment is playing, as soon as the playing of said target song the target content segment ends, playing the next song content segment immediately subsequent to said target song the target content segment;~~ and

~~(j) if a skip command is given by the user while said target song received while the target content segment is playing, continuing on step (e) checking whether the beginning portion of the content segment immediately subsequent to the target content segment is in the pre-buffer cache.~~

10. (Currently Amended) The method of Claim 7, wherein if the check result of step (e) ~~is no beginning portion of the target content segment is not in the pre-buffer cache, the method, further comprised comprising the steps of:~~

~~(k) sending a request to stop transmitting of said song in playing the playing content segment and to start transmitting said target song the target content segment and at least substantially simultaneously;~~

~~(l) deleting the pre-cached portion for any song any content segment which precedes said target song the target content segment in the pre-determined sequence of songs after elapse of a predetermined, configurable time interval content segments from the pre-buffer cache;~~

~~(m) downloading said target song at least a remaining portion of the target content segment; and~~

~~(n) begin playing said target the target content segment song while being downloaded as soon as said buffer allows so; and after a sufficient portion of the target content segment has been downloaded (o) at the same time with step (n), continuing on step (a).~~

11. (Currently Amended) The method of Claim 10, ~~subsequent to step (n),~~
further comprising the steps of:

(p) ~~if another skip command is given by the user while said playback is skipped from the target song is playing, continuing on to step (c) content segment to another target content segment, checking whether the portion of the other target content segment is in the pre-buffer cache; and~~

(q) ~~if no skip command is given by the user while said playback is not skipped from the target content segment song is playing, as soon as the playing of said target song ends, playing the first small portion of the next song content segment subsequent to said target song; the target content segment after the end of the target content segment is played and~~

(r) ~~at the same time with step (q), downloading the rest of said target song at least a portion of the target content segment which is not in the pre-buffer cache;~~

(s) ~~at the same time with step (q), continuing on step (a), wherein if portions of the one or more songs more content segments subsequent to said next song the content segments in the pre-determined sequence of content segments are already pre-cached in the pre-buffer cache, skipping said one the downloading of the beginning portions of the one or more songs more content segments already having beginning portions in the pre-buffer cache and downloading the beginning portions of the subsequent content segments such that portions of each of the number of content segments are downloaded to the pre-buffer cache, ones, consecutively, to make up said number; and~~

(t) ~~subsequent to step (q), playing the rest of the next song which is being download from the server over the Internet~~

12. (Currently Amended) The method of Claim 6, wherein said first small ~~the~~
portion of the target content segment is approximately the data required ~~for playing of~~
the first ten seconds of the target content segment.

13. (Currently Amended) The method of Claim 6, wherein ~~said-number-of~~ the number of portions of content segments to cache in advance is five.

14. (Currently Amended) The method of Claim 6, wherein ~~said-number-of~~ songs-the number of portions of content segments to cache in advance is all-songs-all content segments in the pre-determined sequence of content segments that are subsequent to the-song-in-playing playing content segment.

15. (Currently Amended) The method of Claim 6, wherein ~~said-buffer-the pre-~~ buffer cache follows a first-in first-out algorithm and allows writing while reading.

16. (Currently Amended) A ~~program-computer-readable~~ storage medium readable by a user's computer having a processor, tangibly embodying a program of instructions executable by the computer to perform a method, having instructions stored thereon that, if executed by a computing device, cause the computing device to perform operations ~~for smoothly-playing a predetermined sequence of content segments~~ songs-transmitted from a remote server to a local device over the Internet, comprising the steps of:

(a)-~~as soon as a song starts to play~~ in response to initiation of play of a a content segment on the computing device, ~~downloading to said-computer the computing device,~~ consecutively, a first-small-portion of each of a number of-songs-of content segments ~~which are, in the pre-determined sequence, subsequent to said-song-in-the~~ playing-in-an alternating fashion; content segment

~~wherein said first small portion of each of said number of songs downloaded is limited to a playtime not incurring a royalty;~~

(b)- ~~pre-caching said downloaded small-the downloaded~~ portions in a pre-cache buffer which is an area of said local device's memory pre-buffer cache of the computing device;

(c)- ~~as soon as the user skips in response to skipping from a song in playing to a target song~~ playing content segment to a target content segment, ~~checking whether a~~

~~file for said the portion for the target song exists in said buffer, wherein if the check result is yes, continuing on to step (d) content segment is in the pre-buffer cache; and~~

~~(d) playing the first small if the portion of the target content segment is in the pre-buffer cache, initiating play of the portion of said target song the target content segment from the pre-buffer cache, wherein the pre-determined sequence of content segments was pre-scheduled for network broadcast on one of a plurality of channels, including:~~

~~creating and maintaining, by a work manager and associated scheduler objects, a broadcast schedule for each of the channels according to predefined criteria;~~

~~checking, by at least one producer thread, the broadcast schedule for each of the channels at configurable intervals;~~

~~incrementing, by at least one producer thread, the broadcast schedule for each of the channels by generating a work request and placing the work request in a task queue; and~~

~~executing, by worker threads, the work requests; and~~

~~(e) at the same time as step (d) starts, deleting all pre-cached songs preceding said target song in said pre-determined sequence.~~

17. (Currently Amended) The program computer-readable storage medium of Claim 16, wherein the operations further comprising the steps of comprise:

~~(f) as soon as step (d) starts, downloading the rest of said target song at least another portion of the target content segment that is not in the pre-puffer cache; and~~

~~(g) playing the rest of said other portion of the target song which is being downloaded from the server over the Internet content segment.~~

18. (Previously Presented) The program computer-readable storage medium of Claim 17, wherein the operations further comprising the step of comprise:

~~(h) as soon as step (d) starts, continuing on to step (a), if the portion of the target content segment is in the pre-buffer cache, downloading, consecutively, a portion of each of a number of content segments which are, in the pre-determined sequence, subsequent to the target content segment, wherein if portions of the one or more songs~~

more content segments subsequent to said ~~target song~~ the target content segment already ~~pre-cached in the pre-buffer cache~~, skipping said ~~one~~ the downloading of the portions of the one or more songs ~~more content segments already having portions in the pre-buffer cache~~ and downloading the portions of the subsequent ones, consecutively to make up said ~~number~~ content segments such that portions of each of the number of content segments are downloaded to the pre-buffer cache.

19. (Currently Amended) The program computer-readable storage medium of Claim 18, wherein the operations further comprising the steps of comprise:

(i) ~~if no skip command is given by the user while said target song received while the target content segment is playing, as soon as the playing of said target song~~ the target content segment ends, playing the next song content segment immediately subsequent to said target song; and

(j) ~~if a skip command is given by the user while said target song received while the target content segment is playing, continuing on to step (e) checking whether the beginning portion of the content segment immediately subsequent to the content segment is in the pre-buffer cache.~~

20. (Currently Amended) The program computer-readable storage medium of Claim 17, wherein if ~~the check result of step (c) is no beginning portion of the target content segment is not in the pre-buffer cache~~, the operations further comprising the steps of comprise:

(k) ~~sending a request to stop transmitting of said song in playing the playing content segment and to start transmitting said target song~~ the target content segment and at least substantially simultaneously;

(l) ~~at the same time with step (k), deleting the pre-cached portion for any song portion of any content segment which is prior to said target song~~ the target content segments in the pre-determined sequence of songs of content segments from the pre-buffer cache;

~~(m) downloading said target song at least a remaining portion of the target content segment; and~~

~~(n) begin playing said target song while being downloaded as soon as said buffer allows so; and the target content segment after a sufficient portion of the target content segment has been downloaded~~

~~(o) at the same time with step (n), continuing on step (a).~~

21. (Currently Amended) The program computer-readable storage medium of Claim 20, wherein the operations subsequent to step (n), further comprising the steps of comprise:

~~(p) if another skip command is given by the user while said playback is skipped from the target song is playing, continuing on to step (c) content segment to another target content segment, checking whether the portion of the other target content segment is in the pre-buffer cache; and~~

~~(q) if no skip command is given by the user while said playback is not skipped from the target song is playing content segment, as soon as the playing of said target song ends, playing the first small portion of the next song content segment subsequent to said target song; the target content segment which is not in the pre-buffer cache and~~

~~(r) at the same time with step (q), downloading the rest of said target song at least a portion of the target content segment which is not in the pre-buffer cache;~~

~~(s) at the same time with step (q), continuing on to step (a), wherein if portions of the one or more songs more content segments subsequent to said next song at least a portion of the target content segment are already pre-cached in the pre-buffer cache, skipping said one the downloading of the beginning portions of the one or more songs more content segments already having beginning portions in the pre-buffer cache and downloading the beginning portions of the subsequent content segments such that portions of each of the number of content segments are downloaded to the pre-buffer cache, ones, consecutively to make up said number; and~~

~~(t) subsequent to step (q), playing the rest of the next song which is being download from the server over the Internet~~

22. (Currently Amended) The ~~program~~computer-readable storage medium of Claim 16, wherein ~~said first small~~the portion of the target content segment is approximately the data required ~~for playing of~~the first ten seconds of the target content segment.

23. (Currently Amended) The ~~program~~computer-readable storage medium of Claim 16, wherein ~~said number~~the number of portions of content segments to cache in advance is five.

24. (Currently Amended) The ~~program~~computer-readable storage medium of Claim 16, wherein ~~said number of songs~~the number of portions of content segments to cache in advance is ~~all songs~~all content segments in the pre-determined sequence of content segments that are subsequent to the ~~song in playing~~playing content segment.

25. (Currently Amended) The ~~program~~computer-readable storage medium of Claim 16, wherein ~~said buffer~~the pre-buffer cache follows a first-in first-out algorithm and allows writing while reading.

26. (Currently Amended) The apparatus of Claim 1, wherein ~~said number of songs~~the number of content segments that are ~~each~~each is specified ~~and wherein size of said buffer is also specified to be downloaded to the pre-buffer cache and a size of the pre-buffer cache are configurable via a function call~~.

27. (Currently Amended) The apparatus of Claim 1, wherein ~~said length of said first small portion and said number of songs~~are configurable in a function ~~the number of content segments that are to be downloaded to the pre-buffer cache and the length of each of the portions are configurable via a function call~~.

28. (Currently Amended) The apparatus of Claim 1, further ~~comprising a function to close and remove all of said first small~~wherein the control program is further

configured to delete the portions of each of said number of songs the number of content segments.

29-31. (Cancelled)

31. (Currently Amended) A method for smoothly playing a pre-determined sequence of videos transmitted from a remote server to a local computer having a processor over the Internet, comprising the steps of:

(a) as soon as a video starts to play, downloading to said computer, consecutively, a first small portion of each of a number of videos which are, in said pre-determined sequence, subsequent to said video in playing in an alternating fashion,

wherein said first small portion of each of said number of videos downloaded is limited to a playtime not incurring a royalty;

(b) pre-caching said downloaded small portions in a pre-cache buffer which is an area of said local device's memory;

(c) as soon as the user skips to a target video whose first small portion has been pre-cached, start to play the first small portion of said target video; and

(d) at the same time as said target video starts to play, deleting all pre-cached video preceding said target song in said pre-determined sequence.

32. (Currently Amended) The apparatus of Claim 1, wherein the content segments include songs and/or videos method of Claim 31, further comprising the step of: a user controlling said pre-determined sequence of videos using a graphical user interface.